File Inspec 6/29/04

L1		E Crystallisation+all/ct
L2		ferroelectric
L3	123	L1 and L2

L3 ANSWER 73 OF 123 INSPEC (C) 2004 IEE on STN

Full Text | Cited References

AN 1999:6225935 INSPEC DN A1999-10-6855-114

TI Effect of precursors and stacking structures on crystallization of multi-layered lead zirconate titanate thin films by sol gel method.

AU Suzuki, H.; Kondo, Y.; Kaneko, S. (Dept. of Mater. Sci. & Tech., Shizuoka Univ., Hamamatsu, Japan); Tsutsumi, T.; Miura, T.; Hayashii, T.

SO Chemical Aspects of Electronic Ceramics Processing. Symposium
Editor(s): Kumta, P.N.; Hepp, A.F.; Beach, D.B.; Arkles, B.; Sullivan, J.J.
Warrendale, PA, USA: Mater. Res. Soc, 1998. p.245-50 of xiii+469 pp. 6 refs.
Conference: Boston, MA, USA, 30 Nov-4 Dec 1997
ISBN: 1-55899-400-9

DT Conference Article

TC Experimental

CY United States

LA English

AB Ferroelectric lead zirconate titanate, Pb(Zrx Ti1-x)O3 (hereafter abbreviated as **PZT**), thin films were prepared by annealing precursor films of multilayered structures composed of alternating layers of **PZT** and lead titanate (hereafter abbreviated as PT). This method (which we refer to as multi-seeding) was used in order to lower the processing temperature of **PZT**. The precursor films were prepared from alkoxide precursor solutions. Effects of zirconium to titanium ratios and stacking structures of the multi-layered precursor films on crystallization behavior were studied to improve the electrical properties of the resultant **PZT** thin films. Layers of PT were inserted between every **PZT** layer in order to seed the crystallization of the desired perovskite phase. PT has previously been shown to crystallize with a pure perovskite structure at temperatures as low as 450 degrees C. Precursor layers of **PZT** with different compositions, ranging from x=1 to x=0.53 were prepared. In this process, the compositions of the **PZT** precursors and/or the stacking structure, as well as the heating schedule, had a large effect on the crystallization behavior. Nucleation control of the PT seeding layer by changing the heating schedules played an important role in preparing perovskite **PZT** thin films at low temperatures. Dielectric properties of the resultant films depended on the compositions and annealing temperatures. It was demonstrated that the composition of the resultant **PZT** film was controllable in the multi-seeding process, and that dielectric properties of the resultant films were improved.

CC A6855 Thin film growth, structure, and epitaxy; A6140 Structure of amorphous and polymeric materials; A6150C Physics of crystal growth; A7755 Dielectric thin films; A7780 Ferroelectricity and antiferroelectricity; A6170A Annealing processes; A8140G Other heat and thermomechanical treatments; A8115L Deposition from liquid phases (melts and solutions); A6865 Low-dimensional structures: growth, structure and nonelectronic properties; A6460Q Nucleation in phase transitions; A6160 Crystal structure of specific inorganic compounds

CT ANNEALING; CRYSTAL STRUCTURE; CRYSTALLISATION; FERROELECTRIC THIN FILMS; LEAD COMPOUNDS; MULTILAYERS; **NUCLEATION**; SOL-GEL PROCESSING

ST multilayered thin films; sol gel method; crystallization; precursor effects; stacking structure; ferroelectric thin films; Pb(Zrx Ti1-x)O3; **PZT**; annealing; **PZT/PT alternating layers**; low processing temperature; alkoxide precursor solutions; Zr/Ti ratio; electrical properties; perovskite phase; film composition; heating schedule; nucleation control; dielectric properties; annealing temperature; multi-seeding process; 450 degC; **PZT-PbTiO3**; PbZrO3TiO3-PbTiO3

CHI PbZrO3TiO3-PbTiO3 int, PbZrO3TiO3 int, PbTiO3 int, TiO3 int, ZrO3 int, O3 int, Pb int, Ti int, Zr int, O int, PbZrO3TiO3 ss, PbTiO3 ss, TiO3 ss, ZrO3 ss, O3 ss, Pb ss, Ti ss, Zr ss, O ss

PHP temperature 7.23E+02 K

ET O*Pb*Ti*Zr; O sy 4; sy 4; Pb sy 4; Ti sy 4; Zr sy 4; Pb(Zrx Ti1-x)O3; Pb

cp; cp; Zr cp; Ti cp; O cp; C; Zr; O*Pb*Ti; O sy 3; sy 3; Pb sy 3; Ti sy 3; PbTiO3; PbZrO3TiO; PbTiO; O*Ti; TiO; O*Zr; ZrO; O; Pb; Ti

L3 ANSWER 82 OF 123 INSPEC (C) 2004 IEE on STN

Full Text | Cited References

AN 1998:5873941 INSPEC DN A9809-7755-009

TI Stacking effects on dielectric properties of sol-gel derived Pb(Zr0.53Ti0.47)O3/PbTiO3 thin films.

AU Ki Hyun Yoon; Ji Hwan Shin; Jeong Hwan Park; Dong Hoon Kang (Dept. of Ceramic Eng., Yonsei Univ., Seoul, South Korea)

SO Journal of Applied Physics (1 April 1998) vol.83, no.7, p.3626-9. 15 refs.
Doc. No.: S0021-8979(98)02807-2
Published by: AIP
Price: CCCC 0021-8979/98/83(7)/3626(4)/$15.00
CODEN: JAPIAU ISSN: 0021-8979
SICI: 0021-8979(19980401)83:7L.3626:SEDP;1-Y

DT Journal

TC Experimental

CY United States

LA English

AB A thin film multilayer structure consisting of Pb(Zr0.53Ti0.47)O3 (**PZT**) and PbTiO3 (PT) were fabricated by a sol-gel process. The effects of the number of **PZT**/PT layers upon microstructure and dielectric characteristics were investigated. For a pure **PZT** thin layer annealed at 600 degrees C, the microstructure observed was a rosette type, whereas the insertion of PT interlayers yielded thin films with homogeneous grain distribution regardless of the number of **PZT**/PT layers. With increasing number of **PZT**/PT layers, the leakage current density and coercive field effectively decreased, while the dielectric constant increased. Loss tangent and fixed charge were found to be independent of the number of **PZT**/PT layers. These results are possibly explained by the enhanced crystallization resulting from the introduction of large number of nucleation sites in the multilayer film, and by the stacking of stable and dense **PZT**/PT layers. The thin film composed of three **PZT**/PT layers with a thickness of 450 nm exhibited dielectric constant of 1000, remnant polarization of 20 mu C/cm^2, coercive field of 40 kV/cm, and tan delta of 0.03. The relaxorlike ferroelectric behavior was observed with an increasing number of **PZT**/PT layers.

CC A7755 Dielectric thin films; A7780 Ferroelectricity and antiferroelectricity; A7720 Dielectric permittivity; A7730 Dielectric polarization and depolarization effects; A7740 Dielectric loss and relaxation; A7560E Magnetization curves, hysteresis, Barkhausen and related effects; A6480G Microstructure

CT CERAMICS; COERCIVE FORCE; CRYSTAL MICROSTRUCTURE; CRYSTALLISATION; DIELECTRIC LOSSES; DIELECTRIC POLARISATION; FERROELECTRIC MATERIALS; FERROELECTRIC THIN FILMS; LEAD COMPOUNDS; **NUCLEATION**; PERMITTIVITY; ZIRCONIUM COMPOUNDS

ST stacking effects; dielectric properties; sol-gel derived thin films; multilayer structure; microstructure; rosette type; homogeneous grain distribution; leakage current density; coercive field; dielectric constant; loss tangent; enhanced crystallization; nucleation sites; remnant polarization; relaxorlike ferroelectric behavior; 600 C; Pb(Zr0.53Ti0.47)O3-PbTiO3

CHI PbZr0.53Ti0.47O3-PbTiO3 int, PbZr0.53Ti0.47O3 int, PbTiO3 int, Ti0.47 int, Zr0.53 int, TiO3 int, O3 int, Pb int, Ti int, Zr int, O int, PbZr0.53Ti0.47O3 ss, PbTiO3 ss, Ti0.47 ss, Zr0.53 ss, TiO3 ss, O3 ss, Pb ss, Ti ss, Zr ss, O ss

PHP temperature 8.73E+02 K

ET O*Pb*Ti*Zr; O sy 4; sy 4; Pb sy 4; Ti sy 4; Zr sy 4; Pb(Zr0.53Ti0.47)O3; Pb cp; cp; Zr cp; Ti cp; O cp; O*Pb*Ti; O sy 3; sy 3; Pb sy 3; Ti sy 3; PbTiO3; C; Pb(Zr0.53Ti0.47)O3-PbTiO3; PbZr0.53Ti0.47O; PbTiO; Ti; Zr; O*Ti; TiO; O; Pb

L3 ANSWER 83 OF 123 INSPEC (C) 2004 IEE on STN

Full Text | Citing References

AN 1998:5853330 INSPEC DN A9808-8115L-008; B9804-0520-018
TI Seeding studies in **PZT** thin films.
AU Wu, A.; Vilarinho, P.M.; Salvado, I.M.M.; Baptista, J.L. (Dept. of Ceramic & Glass Eng., Aveiro Univ., Portugal)
SO Materials Research Bulletin (Jan. 1998) vol.33, no.1, p.59-68. 10 refs.
Doc. No.: S0025-5408(97)00189-X
Published by: Elsevier
Price: CCCC 0025-5408/98/$19.00+.00
CODEN: MRBUAC ISSN: 0025-5408
SICI: 0025-5408(199801)33:1L.59:SSTF;1-5
DT Journal
TC Experimental
CY United States
LA English
AB Lead zirconate titanate (**PZT**) solid solutions exhibit excellent ferroelectric, piezoelectric, pyroelectric, and electrooptical properties and, therefore, are very attractive for the electronic industry. Low-temperature thermal treatment of the films enhances the incorporation of sol-gel derived **PZT** thin films into integrated circuits. The nucleation temperature of the perovskite phase and the temperature to get a pure perovskite phase can be lowered using heterogeneous nucleation. In this work, thin films of **PZT** with a zirconium to titanium ratio of 52/48 have been prepared by the sol-gel method using metal alkoxides. Different types of crystalline seeds were used, and their effects on the perovskite phase crystallization were compared. The crystallographic and morphological properties of the films have been analyzed by X-ray diffraction and scanning electron microscopy.
CC A8115L Deposition from liquid phases (melts and solutions); A7780 Ferroelectricity and antiferroelectricity; A7755 Dielectric thin films; B0520 Thin film growth; B2810F Piezoelectric and ferroelectric materials
CT FERROELECTRIC MATERIALS; FERROELECTRIC THIN FILMS; LEAD COMPOUNDS; **NUCLEATION**; SOL-GEL PROCESSING; X-RAY DIFFRACTION
ST **PZT thin films**; ferroelectric; piezoelectric; pyroelectric; electrooptical properties; sol-gel derived; nucleation temperature; perovskite phase; morphological properties; X-ray diffraction; scanning electron microscopy; **PZT**; PbZrO3TiO3
CHI PbZrO3TiO3 ss, TiO3 ss, ZrO3 ss, O3 ss, Pb ss, Ti ss, Zr ss, O ss
ET O*Pb*Ti*Zr; O sy 4; sy 4; Pb sy 4; Ti sy 4; Zr sy 4; PbZrO3TiO; Pb cp; cp; Zr cp; O cp; Ti cp; O*Ti; TiO; O*Zr; ZrO; O; Pb; Ti; Zr

L3 ANSWER 87 OF 123 INSPEC (C) 2004 IEE on STN

Full Text | Citing References

AN 1997:5741723 INSPEC DN A9724-8115L-004; B9712-0520-015
TI Low-temperature processing of highly oriented Pb(ZrxTi1-x)O3 thin film with multi-seeding layers.
AU Suzuki, H.; Kaneko, S. (Dept. of Mater. Sci. & Technol., Shizuoka Univ., Hamamatsu, Japan); Murakami, K.; Hayashi, T.
SO Japanese Journal of Applied Physics, Part 1 (Regular Papers, Short Notes & Review Papers) (Sept. 1997) vol.36, no.9B, p.5803-7. 12 refs.
Published by: Publication Office, Japanese Journal Appl. Phys
CODEN: JAPNDE ISSN: 0021-4922
SICI: 0021-4922(199709)36:9BL.5803:TPHO;1-2
Conference: Ferroelectric Materials and their Applications. 14th Meeting. Kyoto, Japan, 28-31 May 1997
DT Conference Article; Journal
TC Experimental
CY Japan
LA English
AB An improved sol-gel process using molecular-designed alkoxide precursor was described for a lead zirconate titanate (**PZT**) thin film. This method

involves the insertion of inter-layer films of a perovskite lead titanate (PT) layer as a transient seeding layer between each **PZT** layers, which offers nucleation sites to reduce the activation energy for the crystallization, leading to the low processing temperature (hereafter, abbreviated as a multi-seeding process). An intermediate pyrochlore phase developed in the film by annealing at around 400 degrees C in an air, and then was completely converted to a perovskite phase at a low temperature of 450 degrees C. The relative permittivity of the resulting film annealed at 450 degrees C increased with increasing film thickness and reached about 350 at 1.9 mu m. In addition, highly oriented **PZT** film was obtained by annealing at 500 degrees C for 2 hours in an air. This highly oriented him exhibited high relative permittivity of about 500 due to its microstructure. As a result, it was demonstrated that multi-seeding process was desirable for obtaining a single phase perovskite **PZT** film at low temperatures.

CC A8115L Deposition from liquid phases (melts and solutions); A7780 Ferroelectricity and antiferroelectricity; A7755 Dielectric thin films; A7760 Piezoelectricity and electrostriction; A8120L Preparation of ceramics and refractories; A6855 Thin film growth, structure, and epitaxy; A7720 Dielectric permittivity; A8140G Other heat and thermomechanical treatments; A8140R Electrical and magnetic properties (related to treatment conditions); A6480G Microstructure; B0520 Thin film growth; B2810F Piezoelectric and ferroelectric materials; B0540 Ceramics and refractories (engineering materials science)

CT ANNEALING; CRYSTAL MICROSTRUCTURE; CRYSTALLISATION; FERROELECTRIC MATERIALS; FERROELECTRIC THIN FILMS; LEAD COMPOUNDS; **NUCLEATION**; PERMITTIVITY; PHASE EQUILIBRIUM; PIEZOCERAMICS; SOL-GEL PROCESSING

ST low-temperature processing; highly oriented Pb(ZrxTi1-x)O3 thin film; multi-seeding layers; sol-gel process; molecular-designed alkoxide precursor; lead zirconate titanate; inter-layer films; perovskite lead titanate; transient seeding layer; nucleation sites; activation energy; crystallization; low processing temperature; multi-seeding process; intermediate pyrochlore phase; annealing; relative permittivity; film thickness; **highly oriented PZT film**; microstructure; **single phase perovskite PZT film**; low temperatures; 400 to 500 C; 1.9 mum; **PZT**; PbZrO3TiO3

CHI PbZrO3TiO3 ss, TiO3 ss, ZrO3 ss, O3 ss, Pb ss, Ti ss, Zr ss, O ss

PHP temperature 6.73E+02 to 7.73E+02 K; size 1.9E-06 m

ET O*Pb*Ti*Zr; O sy 4; sy 4; Pb sy 4; Ti sy 4; Zr sy 4; Pb(ZrxTi1-x)O3; Pb cp; cp; Zr cp; Ti cp; O cp; C; PbZrO3TiO; O*Ti; TiO; O*Zr; ZrO; O; Pb; Ti; Zr

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=> d his

     (FILE 'HOME' ENTERED AT 14:38:01 ON 29 JUN 2004)

     FILE 'INSPEC' ENTERED AT 14:39:11 ON 29 JUN 2004
                E CRYSTALLISATION+ALL/CT
L1        30811 E6 OR E12
L2         9629 PZT OR FERREROELECTRIC
L3          123 L1 AND L2

=>
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L Number	Hits	Search Text	DB	Time stamp
1	346	"Al-Shareef" Bellur Auciello Kingon	USPAT; US-PGPUB	2004/06/29 14:06
2	24360	ferroelectric or pzt	USPAT; US-PGPUB	2004/06/29 14:03
3	211	("Al-Shareef" Bellur Auciello Kingon) and (ferroelectric or pzt)	USPAT; US-PGPUB	2004/06/29 14:03
4	1240005	@ad>19981123 @rlad>19981123	USPAT; US-PGPUB	2004/06/29 14:04
5	88	(("Al-Shareef" Bellur Auciello Kingon) and (ferroelectric or pzt)) not (@ad>19981123 @rlad>19981123)	USPAT; US-PGPUB	2004/06/29 14:04
6	79	("Al-Shareef" Bellur Auciello Kingon).in.	USPAT; US-PGPUB	2004/06/29 14:12
7	29	(ferroelectric or pzt) and (("Al-Shareef" Bellur Auciello Kingon).in.)	USPAT; US-PGPUB	2004/06/29 14:13
8	11	((ferroelectric or pzt) and (("Al-Shareef" Bellur Auciello Kingon).in.)) not (@ad>19981123 @rlad>19981123)	USPAT; US-PGPUB	2004/06/29 14:13
-	65379	438/$.ccls.	USPAT; US-PGPUB	2004/06/29 14:02
-	0	semiconductor or ic or "integrated circuit" or microelectronic	USPAT; US-PGPUB	2003/05/29 17:11
-	2234	ferroelectric with layers	USPAT; US-PGPUB	2004/06/28 14:01
-	0	438/3,240,396/ccls	USPAT; US-PGPUB	2004/06/28 14:01
-	3506	438/3,240,396.ccls.	USPAT; US-PGPUB	2004/06/28 14:02
-	394	(ferroelectric with layers) and 438/3,240,396.ccls.	USPAT; US-PGPUB	2004/06/28 14:03
-	1	("6229166").PN.	USPAT; US-PGPUB	2004/06/28 14:04
-	116	((ferroelectric with layers) and 438/3,240,396.ccls.) not (@ad>19981123 @rlad>19981123)	USPAT; US-PGPUB	2004/06/28 14:55
-	99339	seed	USPAT; US-PGPUB	2004/06/28 14:05
-	4	(((ferroelectric with layers) and 438/3,240,396.ccls.) not (@ad>19981123 @rlad>19981123)) and seed	USPAT; US-PGPUB	2004/06/28 14:05
-	34	("0476274" | "2490547" | "2622184" | "2801322" | "2925329" | "3190262" | "3404873" | "3520416" | "3549412" | "3659402" | "3823926" | "3969449" | "4036915" | "4080926" | "4288396" | "4529427" | "4833976" | "4842893" | "4847469" | "4954371" | "5034372" | "5097800" | "5110622" | "5120703" | "5139999" | "5165960" | "5204314" | "5225561" | "5248787" | "5259995" | "5280012" | "5376409" | "5536323" | "5554866").PN.	USPAT	2004/06/28 14:20
-	112	(((ferroelectric with layers) and 438/3,240,396.ccls.) not (@ad>19981123 @rlad>19981123)) not ((((ferroelectric with layers) and 438/3,240,396.ccls.) not (@ad>19981123 @rlad>19981123)) and seed)	USPAT; US-PGPUB	2004/06/28 18:54
-	1	("5155658").PN.	USPAT; US-PGPUB	2004/06/28 16:33
-	11390	pzt	USPAT; US-PGPUB	2004/06/28 18:54

-	3232	tio or pbtio	USPAT; US-PGPUB	2004/06/28 18:54
-	23	pzt with (tio or pbtio)	USPAT; US-PGPUB	2004/06/28 18:54
-	5	(pzt with (tio or pbtio)) not (@ad>19981123 @rlad>19981123)	USPAT; US-PGPUB	2004/06/28 18:55
-	62	pzt with combinations	USPAT; US-PGPUB	2004/06/28 18:56
-	15	(pzt with combinations) not (@ad>19981123 @rlad>19981123)	USPAT; US-PGPUB	2004/06/28 19:01
-	204599	crystallization or nucleation or seed	USPAT; US-PGPUB	2004/06/28 19:01
-	11390	pzt	USPAT; US-PGPUB	2004/06/28 19:01
-	184	(tio or pbtio) and pzt	USPAT; US-PGPUB	2004/06/28 19:01
-	56	((tio or pbtio) and pzt) not (@ad>19981123 @rlad>19981123)	USPAT; US-PGPUB	2004/06/28 19:01

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   (FILE 'HOME' ENTERED AT 13:48:26 ON 29 JUN 2004)

    FILE 'INSPEC' ENTERED AT 13:48:35 ON 29 JUN 2004
                E CRYSTALLIZATION+ALL/CT
L1         30612 E2
                E NUCLEATION+ALL/CT
L2          7810 E4
L3         54122 FERROELECTRIC OR PZT
L4         51070 SEED OR NUCLEATION
L5           736 NUCLEATES
L6         51393 L4 OR L5
L7         37842 L1 OR L2
L8           127 L7 AND L3 AND L6
L9         46168 (TOP AND BOTTOM) OR (UPPER AND LOWER)
L10            3 L8 AND L9

=> d 1-3 all
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L10 ANSWER 1 OF 3 INSPEC (C) 2004 IEE on STN

Full Text | Citing References

AN 2003:7502379 INSPEC DN A2003-04-7755-006; B2003-02-2130-013

TI Iridium based electrodes for **ferroelectric** capacitor fabrication.

AU Johnson, J.A.; Lisoni, J.G.; Wouters, D.J. (IMEC, Leuven, Belgium)

SO Ferroelectric Thin Films X (Materials Research Society Symposium Proceedings Vol.695)
Editor(s): Gilbert, S.R.; Trolier-McKinstry,S.; Miyasaka,Y.; Streiffer, S.K.; Wouters,D.J.
Warrendale, PA, USA: Mater. Res. Soc, 2002. p.59-64 of xv+424 pp. 5 refs.
Conference: Boston, MA, USA, 25-29 Nov 2001

Cate

DT Conference Article

TC Experimental; Practical

CY United States

LA English

AB Ir and its conductive oxide, IrO2, are candidates to replace Pt as the electrodes in **ferroelectric** capacitors (FECAPs) because of improved endurance (since e.g. Pt/**PZT**/Pt shows strong fatigue) and also because of the oxygen barrier properties of Ir/IrO2 stacks that enable the fabrication of stacked FECAPs on **top** of contact plugs. Two important issues related to these electrodes are the control of the **ferroelectric** layer orientation on **top** of these materials, as well as material stability (e.g. oxidation and possible growth of large IrO2 crystallites). In this work, we show that IrO2 **bottom** electrodes affect the crystallization of sol-gel deposited Pb(Zr,Ti)O3 (**PZT**). While **PZT** films deposited on (111) Pt show a (111) preferential orientation, IrO2 electrodes nucleate strongly different oriented **PZT**. Controlling and changing the microstructure of the **bottom** electrode allows tuning of these **PZT** orientations and the resulting grain morphology, and, consequently, their FECAP polarization hysteresis properties.

CC A7755 Dielectric thin films; A6480G Microstructure; A6470K Solid-solid transitions; A8115L Deposition from liquid phases (melts and solutions); A7730 Dielectric polarization and depolarization effects; A7780D Ferroelectric domain structure and effects; hysteresis; B2130 Capacitors; B2860F Ferroelectric devices; B0520J Deposition from liquid phases; B2810F Piezoelectric and ferroelectric materials

CT CRYSTAL ORIENTATION; **CRYSTALLISATION**; CRYSTALLITES; DIELECTRIC HYSTERESIS; DIELECTRIC POLARISATION; **FERROELECTRIC** CAPACITORS; **FERROELECTRIC** THIN FILMS; GRAIN SIZE; IRIDIUM COMPOUNDS; LEAD COMPOUNDS; **NUCLEATION**; SOL-GEL PROCESSING

ST iridium based electrodes; **ferroelectric capacitors**; FECAPs; conductive oxide; **IrO2 bottom electrodes**; oxygen barrier properties; Ir/IrO2 stacks; contact plugs; **ferroelectric layer orientation**; material stability; oxidation; IrO2 crystallites growth; crystallization; sol-gel deposited Pb(Zr,Ti)O3; **PZT**; **nucleation**; microstructure; **PZT**

orientations; grain morphology; polarization; hysteresis properties; **IrO2-PZT**; IrO2-PbZrO3TiO3
CHI IrO2-PbZrO3TiO3 int, PbZrO3TiO3 int, IrO2 int, TiO3 int, ZrO3 int, Ir int, O2 int, O3 int, Pb int, Ti int, Zr int, O int, PbZrO3TiO3 ss, TiO3 ss, ZrO3 ss, O3 ss, Pb ss, Ti ss, Zr ss, O ss, IrO2 bin, Ir bin, O2 bin, O bin
ET Ir; Ir*O; IrO2; Ir cp; cp; O cp; Pt; Pb*Zr; Pb sy 2; sy 2; Zr sy 2; Pb(Zr; Pb cp; Zr cp; Ti; IrO; O*Pb*Ti*Zr; O sy 4; sy 4; Pb sy 4; Ti sy 4; Zr sy 4; PbZrO3TiO; Ti cp; O*Ti; TiO; O*Zr; ZrO; O; Pb; Zr

L10 ANSWER 2 OF 3 INSPEC (C) 2004 IEE on STN

Full Text | Cited References

AN 2002:7238960 INSPEC DN B2002-05-2860F-003
TI Low temperature epitaxial growth of **PZT** on conductive perovskite LaNiO3 electrode for embedded capacitor-over-interconnect (COI) FeRAM application.
AU Lung, S.L. (Macronix Int. Co., Hsinchu, Taiwan); Liu, C.L.; Chen, S.S.; Lai, S.C.; Tsai, C.W.; Sheng, T.T.; Tahui Wang; Pan, S.; Wu, T.B.; Liu, R.
SO International Electron Devices Meeting. Technical Digest (Cat. No.01CH37224)
Piscataway, NJ, USA: IEEE, 2001. p.12.4.1-4 of 951 pp. 4 refs. Also available on CD-ROM in PDF format
Conference: Washington, DC, USA, 2-5 Dec 2001
Sponsor(s): Electron Devices Soc. IEEE
Price: CCCC 0-7803-7050-3/01/$10.00
ISBN: 0-7803-7050-3

Date

DT Conference Article
TC Application; Experimental
CY United States
LA English
AB By using a conductive perovskite LaNiO3 (LNO) **bottom** electrode as **seed** layer, the crystallization temperature of in-situ sputter deposited **PZT** has been greatly reduced from 600 degrees C to 350 degrees C 400 degrees C. LNO's near-perfect lattice match with **PZT** allows **PZT** to growth epitaxially at low temperature. The 2Pr value of the low temperature grown **PZT** is about 20 mu C/cm^2, and this provides 130mV-400mV sense margin when bit line capacitance is 800fF. When Pt is used as the **top** electrode, an amorphous layer, which degrades the electric fatigue performance, is found at the interface of Pt and **PZT**. When the **top** electrode is replaced by LNO, the thickness of the amorphous layer is decreased, and fatigue is improved. COI FeRAM structure can be easily achieved by this low temperature capacitor process, and is suitable for advanced Cu/low-K embedded logic application.
CC B2860F Ferroelectric devices; B0520B Sputter deposition; B1265D Memory circuits; B2130 Capacitors
CT **CRYSTALLISATION**; EPITAXIAL LAYERS; **FERROELECTRIC** CAPACITORS; **FERROELECTRIC** STORAGE; **FERROELECTRIC** THIN FILMS; LANTHANUM COMPOUNDS; LEAD COMPOUNDS; RANDOM-ACCESS STORAGE; SPUTTERED COATINGS
ST low temperature epitaxial growth; **PZT thin film**; embedded capacitor-over-interconnect FeRAM; conductive perovskite LaNiO3 electrode; electrical fatigue; Pt electrode; amorphous layer; **seed layer**; crystallization; sputter deposition; lattice matching; 350 to 400 C; 800 fF; **PZT-LaNiO3**; PbZrO3TiO3-LaNiO3
CHI PbZrO3TiO3-LaNiO3 int, PbZrO3TiO3 int, LaNiO3 int, TiO3 int, ZrO3 int, La int, Ni int, O3 int, Pb int, Ti int, Zr int, O int, PbZrO3TiO3 ss, LaNiO3 ss, TiO3 ss, ZrO3 ss, La ss, Ni ss, O3 ss, Pb ss, Ti ss, Zr ss, O ss
PHP temperature 6.23E+02 to 6.73E+02 K; capacitance 8.0E-13 F
ET La*Ni*O; La sy 3; sy 3; Ni sy 3; O sy 3; LaNiO3; La cp; cp; Ni cp; O cp; C; Pr; F; Pt; Cu; K; O*Pb*Ti*Zr; O sy 4; sy 4; Pb sy 4; Ti sy 4; Zr sy 4; PbZrO3TiO; Pb cp; Zr cp; Ti cp; LaNiO; O*Ti; TiO; O*Zr; ZrO; La; Ni; O; Pb; Ti; Zr

L10 ANSWER 3 OF 3 INSPEC (C) 2004 FIZ KARLSRUHE on STN

Full Text | Citing References

AN 1995:4896358 INSPEC DN A9507-7755-001
TI Phase annealing effects on the electrical properties of Pb(Zr0.53Ti0.47)O3 thin films with RuO2 electrodes.
AU Al-Shareef, H.N.; Bellur, K.R.; Auciello, O.; Kingon, A.I. (Dept. of Mater. Sci. & Eng., North Carolina State Univ., Raleigh, NC, USA)
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DT Journal
TC Experimental
CY Switzerland
LA English
AB The electrical properties and crystallization of Pb(Zr0.53Ti0.47)O3 (**PZT**) thin films grown on RuO2 electrodes by the sol-gel process have been studied. It was found that the amorphous as-deposited thin film first transforms to a pyrochlore phase at 500 degrees C. On further annealing, perovskite **PZT** begins to crystallize at about 600 degrees C. TEM analysis reveals that a pyrochlore-type second phase still exists in the films even after annealing to temperatures of 750 degrees C for 10 min. These **PZT** films are fatigue-free, but they show large property variation and high leakage currents (J=10-3 A cm-2 at 1 V). An 800 degrees C annealing treatment, for 10 min in air, of the RuO2, **bottom** electrode prior to film deposition enhanced perovskite **PZT nucleation**, thereby eliminating the pyrochlore-type second phase. In addition, the leakage currents of **PZT** films grown on annealed RuO2, electrodes are about two orders of magnitude lower than those of **PZT** films grown on unannealed RuO2. It is also observed that annealing the entire capacitor stack after the **top** electrode deposition improved capacitor properties.
CC A7755 Dielectric thin films; A7780 Ferroelectricity and antiferroelectricity; A7360H Electronic properties of insulating thin films; A6170A Annealing processes; A6470K Solid-solid transitions
CT AMORPHOUS STATE; ANNEALING; **CRYSTALLISATION**; ELECTRICAL RESISTIVITY; **FERROELECTRIC** MATERIALS; **FERROELECTRIC** THIN FILMS; LEAD COMPOUNDS; LEAKAGE CURRENTS; TRANSMISSION ELECTRON MICROSCOPY
ST Pb(Zr0.53Ti0.47)O3 thin films; electrical properties; crystallization; sol-gel process; pyrochlore phase; annealing; TEM; fatigue-free; leakage currents; capacitor stack; phase evolution; 500 to 800 C; PbZr0.53Ti0.47O3
CHI PbZr0.53Ti0.47O3 ss, Ti0.47 ss, Zr0.53 ss, O3 ss, Pb ss, Ti ss, Zr ss, O ss
PHP temperature 7.73E+02 to 1.07E+03 K
ET O*Pb*Ti*Zr; O sy 4; sy 4; Pb sy 4; Ti sy 4; Zr sy 4; Pb(Zr0.53Ti0.47)O3; Pb cp; cp; Zr cp; Ti cp; O cp; O*Ru; RuO2; Ru cp; C; PbZr0.53Ti0.47O3; PbZr0.53Ti0.47O; Ti; Zr; O; Pb

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